FINAL

Appendix E
Health and Safety Plan

For the

Removal Action
High Street Outfall and 40th Avenue
Storm Sewer System

Vasquez Boulevard/Interstate 70 Site,
Operable Unit #2

Prepared for:

City and County of Denver
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June 19, 2015

HEALTH AND SAFETY PLAN

PROJECT NAME:	Design Investigation and Removal Action High Street Outfall and 40th Avenue Storm Sewer System
PROJECT SITE LOCATION:	Vasquez Boulevard/Interstate 70 Site Operable Unit 2 Western Portion of Denver Coliseum Parking Lot and Globeville Landing Park adjacent to the South Platte River Intersection of Arkins Ct and McFarland Dr Denver, CO 80216
PROJECT MANAGER:	Timothy Shangraw
SITE SAFETY AND HEALTH OFFICER:	Robert Jelinek
PREPARATION DATE:	June 19, 2015

APPROVED BY: **EMSI Project Manager**

_____ _____ _____ _____ _____ _____ _____ _____ _____

Timothy Shangraw (Date)

APPROVED BY: **EMSI On-Site Health and Safety Officer (HSO)**

_____ _____ _____ _____ _____ _____ _____ _____ _____

Robert Jelinek (Date)

This document was prepared for the sole use of Engineering Management Support, Inc., the City and County of Denver, and the regulatory agencies involved with the project, the only intended beneficiary of our work. No other parties should rely on the information contained herein without the prior written consent of EMSI.

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1 PURPOSE AND INTRODUCTION

The purpose of this Health and Safety Plan (HASP), prepared by Engineering Management Support, Inc. (EMSI), is to provide background information, assign responsibilities, and establish personal protection standards and safety procedures for tasks associated with a design investigation and the "environmental components" of constructing a barrier system associated with the open channel stormwater drainage structure planned to pass through and downstream of Operable Unit 2 (OU-2) of the Vasquez Boulevard/Interstate 70 (VB/I-70) Superfund Site. The stormwater drainage structure to be constructed in OU-2 is part of the High Street Outfall and 40th Avenue Storm Sewer System that is intended to convey stormwater from Regional Transportation District (RTD), Colorado Department of Transportation (CDOT), and City and County of Denver (CCD) projects that are being developed in the VB/I-70 watershed area.

The planned barrier system is located in the parking lot west of the Denver Coliseum and in a portion of Globeville Landing Park between the parking lot and the South Platte River, as shown on Figures E-1 and E-2. Activities identified in this HASP will be completed in accordance with the Removal Action Work Plan (RAWP). This HASP is Appendix E to the RAWP. Companion documents to this HASP include the Sampling and Analysis Plan (SAP) and Materials Management Plan (MMP). The SAP and MMP are Appendices C and D, respectively, to the RAWP.

The activities for which this HASP applies include conducting a design investigation (drilling of soil borings, collection of waste material and visually-impacted soil samples, completing the borings as piezometers and sampling groundwater, and monitoring for soil gas) and the "environmental components" (i.e., removal of waste material and visually-impacted soils, and groundwater [dewatering water]) associated with construction of the barrier system.

Included in this HASP are an applicability statement, historical Site characterization results, a brief description of work to be conducted, Site-specific health and safety procedures, emergency contacts and procedures, and a compliance agreement. Prior to any work being conducted at the Site, a copy of this HASP will be distributed to all EMSI employees and subcontractors. Prior to anyone entering the Site, they will be required to read this HASP and sign the Compliance Agreement.

2 APPLICABILITY

EMSI personnel, subcontractors and visitors who have the potential to be exposed to chemical or physical hazards are held responsible for operating in accordance with the applicable Occupational Safety and Health Administration (OSHA) rules and regulations, especially provisions of 29 CFR 1910.120, 1910.134, 1910.1001-1101, 1910.1200, and 29 CFR 1926; these provisions are incorporated into this document by reference. Those Site personnel who will perform work at the Site shall produce written documentation at least three (3) days prior to the

commencement of field activities verifying completion of appropriate health and safety training, in accordance with 29 CFR 1910.120, the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard. Many of the training requirements included in these regulations have been summarized by OSHA in a publication entitled, *Training Requirements in OSHA Standards and Training Guidelines* (OSHA, 1998). Personnel are also responsible for adherence to applicable state or local regulations that relate to their respective Site activities.

EMSI requires that subcontractors shall abide by a HASP for their employees covering, among other things, exposure to hazardous materials, and shall complete all work in accordance with the HASP. The subcontractor may choose to use EMSI's HASP as a guide in developing its own HASP or may choose to adopt in full EMSI's HASP. In either case, EMSI's HASP will be considered the primary HASP for all project-related activities; if a HASP is provided by a subcontractor, it will be considered an attachment to this HASP. EMSI reserves the right to review the subcontractor's HASP at any time. All subcontractors shall, at a minimum, follow all provisions of EMSI's HASP and/or applicable OSHA guidelines; whichever is more stringent or appropriate. Although EMSI has prepared the HASP, the City and County of Denver, each subcontractor, and any organizations performing oversight shall be responsible for the health and safety of their employees at the job Site and for providing and verifying that each and every person present at the job Site has the appropriate health and safety training.

Inadequate health and safety precautions on the part of a subcontractor, or EMSI's opinion that subcontractors personnel are or may be exposed to health hazards, can be cause for EMSI to suspend the subcontractor's Site work and ask the subcontractor's personnel to evacuate the hazard area.

3 HISTORICAL SITE CHARACTERIZATION RESULTS

Visibly-impacted soil and material beneath and in the vicinity of the alignment of the proposed barrier system have been characterized, as discussed in Section 2.1 of the RAWP. Compounds of potential concern in the waste material and soil consist of volatile organic compounds (VOCs), polynuclear-aromatic hydrocarbons (PAHs), arsenic, and lead. A trace amount of asbestos was detected at one location, raising the concern that asbestos containing material (ACM) may be present in the subsurface material.

As discussed in Section 2.2 of the RAWP, groundwater quality along the alignment of the barrier system has also been characterized. Compounds of potential concern in groundwater consist of VOCs, arsenic, cadmium, copper, lead, manganese, and zinc. Groundwater depths below the ground surface within and adjacent to the limits of the alignment were measured in 2010 and 2011. Groundwater level depths ranged from 10.7 to 23.8 feet below ground surface.

Soil gas monitoring was conducted in 2010 during the advancement of borings for Site characterization within the limits of the channel alignment. Methane concentrations ranged from 0.5 to 43.4 percent by volume in air (% v/v). Additional measurements to the southeast of the

alignment detected methane concentrations up to 56.7 % v/v. During advancement of borings in 2011, well-head gas at the ground surface was measured and Lower Explosive Limits (LELs) of 100% were recorded at many of the well-heads. Soil gas monitoring results are detailed in Section 2.3 of the RAWP.

4 SCOPE OF WORK

A detailed description of the work to be conducted is provided in Section 3 of the RAWP.

EMSI will manage the design investigation, prepare a results report, participate in and oversee field activities, coordinate with the analytical laboratory, and interact with the City and County of Denver and any regulatory agency personnel. EMSI will be supported by Foresight West Surveying for field surveying and utility clearances; Site Services Drilling for soil boring and piezometer construction, CTL Thompson for geotechnical testing of subsurface samples; and TestAmerica for laboratory analysis of solid and liquid samples.

During implementation of the "environmental components" (i.e., removal of waste material and visually-impacted soils and groundwater [dewatering water]) associated with construction of the barrier system, EMSI will manage and oversee one or more contractors who will remove asphalt pavement and subsurface materials and transport these materials offsite for disposal. The excavation contractor(s) will also be responsible for dewatering the area around the excavation, treatment of the dewatering water (if necessary), and discharge of the water either to the South Platte River or Sand Creek. EMSI will also manage and oversee a barrier system installation contractor.

5 BIOLOGICAL, PHYSICAL, AND CHEMICAL HAZARD EVALUATION

A potential for biological, physical, and chemical hazards will exist at the Site during design investigation activities and implementation of the "environmental components" associated with construction of the drainage structure. A conceptual Site layout plan showing potential facilities and truck traffic routes that might be employed during the "environmental components" is provided as Figure 6 in the RAWP. Potential hazards are described below.

5.1 Biological Hazards

Possible biological hazards include venomous insects (e.g., bees, wasps, spiders) and to a lesser extent poisonous snakes (e.g., rattlesnakes). Exposure to these hazards will be minimized with appropriate protective clothing.

5.2 Physical Hazards

The only personnel who will be allowed access to the Site will be EMSI and subcontractor personnel and City and County of Denver and/or regulatory agency visitors accompanied by an EMSI employee.

Physical hazards which may be encountered include the presence of support vehicles (driller's support truck, forklift for water treatment tanks and equipment) and semi-trucks on the Site, drilling activities (i.e., drill rig), exposure to electrical and other utility hazards, potential for improperly grounded electrical equipment, and noise. In addition, there is a possibility of slip/trip/fall hazards during soil and groundwater sampling, traversing wet/slippery surfaces (e.g., solids storage area shown on Figure 6 of the RAWP), and strains/sprains from carrying of sampling equipment, samples, sample coolers, and heavy tools or equipment. These hazards are discussed in greater detail in Sections 6 and 7.

The potential for extreme weather conditions may exist depending upon the implementation schedule. Extreme weather conditions may include excessive heat or cold, thunderstorms, high wind conditions, heavy rains, and snow/ice. Special precautions will be taken during periods of extreme weather, and work may be halted by the respective Site Safety Officer (SSO) until the severe weather has subsided. In addition, subcontractors may elect to independently halt their activities in the event of extreme weather conditions, especially thunderstorms. Additional information regarding heat and cold stress and other physical hazards is provided in Appendix E-1.

5.3 Chemical Hazards

Based on available information as summarized in Section 3, the primary chemical of concern at the Site are expected to be VOCs, PAHs, metals, soil gas, and ACM in waste material. Exposure could occur from inhalation of dust, vapors, soil gas, or ACM and/or direct skin contact with subsurface materials and groundwater containing these chemical of concern. Contact with the eyes is also a route of exposure for asbestos.

Toxicological properties and hazard assessments of chemicals of concern are provided in Appendix E-2.

6 GENERAL HEALTH AND SAFETY PROCEDURES

This section presents general safety procedures to be followed during the planned activities at the Site. The measures contained herein will be supplemented as necessary with standard safe work practices.

6.1 Organizational Structure

An organizational chart for Site health and safety is included as Figure E-3. This chart presents the identification of Site safety personnel, as follows:

Project Manager

The EMSI Project Manager, Timothy Shangraw, will be responsible for overall design, implementation, safety, and cost/schedule control of the activities described in the RAWP. He will be responsible for making the proper personal protection equipment (PPE) available to EMSI personnel, ensuring that adequate time and budget is available for health and safety activities for EMSI personnel, and making available qualified personnel to perform Site work in a safe manner. He will also be responsible for monitoring compliance of subcontractors and field personnel with this HASP and will have the authority to stop Site work in the event of safety violations or safety concerns.

EMSI On-Site Representative/Health and Safety Officer (HSO)

The EMSI On-Site Representative, Robert Jelinek, will have responsibility for coordinating and overseeing all field-related aspects of the Site investigation and will also serve as the Health and Safety Officer (HSO). In conjunction with the Project Manager, the On-Site Representative/HSO will have day-to-day responsibilities for acquainting field personnel with potential hazards, implementing the health and safety program described in this HASP, and ensuring that work is being performed in a safe manner in accordance with the HASP. In many cases, the EMSI On-Site Representative will be the Project Manager.

Site Safety Officer (SSO)

While conducting activities at the Site, each of the program subcontractors will designate one of their on-Site personnel as the Site Safety Officer (SSO) for the work being performed by the respective subcontractor (Figure E-3). The SSO should be familiar with local emergency services and will be responsible for ensuring that work by the subcontractor is being performed in a safe manner in accordance with the subcontractor's HASP. The SSO will also monitor on-Site hazards and physical condition of their respective personnel. Each SSO has the authority to shutdown operations if the operation poses a potential threat to field personnel.

Field Personnel

All field personnel shall be familiar with the contents of this HASP and sign the Compliance Agreement. Field personnel are also responsible for following the directions of the SSO, performing all work in a safe manner, and maintaining/inspecting PPE.

6.2 On-Site Control

There will be no on-Site control at the Site during the design investigation activities. On-Site control during implementation of the "environmental components" associated with construction of the barrier system will be provided by temporary barricades erected around the drainage channel excavation and the water treatment equipment, if any. All personnel performing work defined in this HASP and any visitors must sign in and out using a field Log Book maintained by the EMSI On-Site Representative.

6.3 Personal Protective Equipment (PPE)

Due to the anticipated level of risk and hazards involved in performing the design investigation tasks and construction activities, Level D PPE, the lowest level, is anticipated to be appropriate for most activities. The specific protective equipment for Level D will consist of the following:

- Steel-toed boots,
- Hard hat,
- Work gloves, or Nitrile gloves, as necessary based on the specific activity,
- Safety glasses, as necessary based on the specific activity (e.g., when collecting samples of landfill materials where ACM may be present),
- Hearing protection (e.g., earplugs or earmuffs), as necessary based on the specific activity, and
- A safety vest or shirt of bright yellow/lime or orange color.

If the action levels for oxygen, carbon monoxide, combustibles, and hydrogen sulfide are not exceeded (see Section 6.7 below), but the action level of volatile organics is exceeded, consideration may be given to continue working by upgrading PPE to a modified Level C. Modified Level C PPE would include Level D protective equipment with the addition of a National Institute for Occupational Safety and Health (NIOSH)-approved full-face or half-mask air purifying respirator. The decision to continue working under these conditions will be made by the On-Site Representative/Health and Safety Officer.

6.4 Communication

This section discusses the equipment and procedures for normal field communications and communications in the event of an emergency.

A cellular telephone shall be carried by the HSO and each SSO. An air horn will be located in each field vehicle for announcing emergency evacuation procedures and backup for other forms of communication. Three long air horn blasts is the emergency signal to indicate that all personnel should leave the work area.

The following standard hand signals will be used in the event that verbal communication becomes impossible:

Hand Signal	Explanation
Hand gripping throat	Out of air, can't breathe
Grip partner's wrist or both hands around waist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK, I am all right, I understand

Thumbs down	No, negative

6.5 Safe Work Practices and Limitations

Site activities will be conducted during daylight hours only. Daylight hours are defined as 7:00 AM to 7:00 PM from May 1 to October 31 and as 8:00 AM to 5:00 PM from November 1 to April 30. The HSO must provide permission for fieldwork conducted by EMSI staff or subcontractors beyond daylight hours or on weekends and holidays. The HSO will review pertinent health and safety matters with on-Site personnel in daily health and safety meetings. Additional work practices and limitations are listed as follows:

- All Site personnel shall acknowledge in the Compliance Agreement (Section 10) that they have read, understood, and agree to comply with this HASP.
- In addition to an initial health and safety meeting, daily project health and safety meetings will be conducted by the HSO (or designated representative) at the start of each workday to discuss the upcoming activities for the day and to address the health and safety procedures to be followed.
- Applicable OSHA guidelines will be followed for all Site activities.
- Dress in accordance with the activity-specific level of protection.
- Eating, drinking, gum or tobacco chewing, and smoking are not permitted in work areas.
- Any person under a physician's care, taking medication, or those who experience allergic reactions must inform the HSO.
- The buddy system must be employed at all times. At least two people from EMSI or their subcontractors should be present during all active field tasks unless specifically permitted by the HSO or designated representative.
- The wearing of contact lenses for on-Site personnel is prohibited by best management practice and OSHA.
- Be aware of symptoms of heat or cold stress, exposure to hazardous chemicals or dangerous atmospheres, and work-related injuries.
- All potential underground utilities (gas, electric, sanitary and storm sewer, water, telephone, cable, fiber optic) at the Site must be identified and marked prior to the commencement of any drilling or excavation activity.
- Good personal hygiene practices are especially important when working in the proximity of potentially hazardous compounds. Of particular importance is the need to keep fingers away from the face unless they have been carefully washed. Cuts and abrasions should be covered by an appropriate dressing.
- Proper lifting techniques should be followed at all times to minimize the risk of back injury.
- All accidents and hazardous material exposure incidents will be reported on the appropriate forms, discussed in Section 6.10.

6.6 Fire Prevention

All flammable and/or combustible liquids (i.e., gasoline, diesel fuel) shall be stored in approved safety containers that meet the specifications of National Fire Protection Association (NFPA)

Code 30 and OSHA 29CFR1910.106(a)(29). Smoking or open flames are not permitted within 20 feet of any flammable liquid container.

All personnel performing work at the Site must be trained in the proper use of fire extinguishers. OSHA-approved portable fire extinguishers will be located in every field vehicle. These extinguishers shall be rated for Class A (wood, paper), B (flammable liquid), and C (electrical) fires, and their locations shall be clearly identified with signs and/or labels. As required by 29CFR1910.157(d), at least one fire extinguisher with the appropriate rating must be located within 75 feet of a Class A fire hazard and 50 feet of a Class B or C fire hazard.

6.7 Health and Safety Practices during Drilling into and Excavation of Waste Material and Visually-Impacted Soils

Hazards associated with drilling into and/or excavation of waste material and visually-impacted soils include oxygen depletion/enrichment and the presence of toxic and flammable and/or explosive gases. The U.S. Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL's) for some of the more common atmospheric conditions/contaminants that are encountered during drilling and excavation activities are as follows:

Test	Permissible Exposure Limit
Oxygen	19.5% to 23.5%
Carbon Monoxide (CO)	Under 35 parts per million (ppm)
Lower Flammable (Explosive) Limit (LFL/LEL)	Under 10% of LFL/LEL
Hydrogen Sulfide (H_2S)	Under 10 ppm
Aromatic hydrocarbons	Under 5 ppm

If site activities include drilling into and/or excavation of waste material and visually-impacted soils, the following action levels and actions shall apply:

Constituent (Instrument)	Action Level	Action
Oxygen (4 Gas Meter)	Below 19.8% in breathing zone	Clear area by 10 feet minimum. Retest site after 2 minutes.
Carbon Monoxide (4 Gas Meter)	35 ppm in breathing zone	Clear area by 10 feet minimum. Retest site after 2 minutes.

Constituent (Instrument)	Action Level	Action
Combustibles (4 Gas Meter)	10% of Lower Explosive Limit (LEL)	Clear area by 10 feet and turn off motor. Retest site after 2 minutes.
Hydrogen Sulfide (4 Gas Meter)	10 ppm	Clear area by 10 feet minimum. Retest site after 2 minutes.

Volatile Organics (PID)	5 ppm	Clear area by 10 feet minimum. Retest site after 2 minutes.

If flammable gas is suspected to be present, the following health and safety practices shall be followed:

- A flammable gas indicator shall be utilized at all times during trenching, excavation, drilling, or when working within ten (10) feet of an open excavation.

- Before personnel are permitted to enter an open trench or excavation, the trench or excavation shall be monitored to ensure that flammable gas is not present in concentrations exceeding 1% and that oxygen is present at a minimum concentration of 19.8%. When in an excavation or trench, each work party shall work no more than five (5) feet from a continuous flammable gas and oxygen monitor.

- When trenching, excavating, or drilling deeper than two (2) feet into the fill, or in the presence of detectable concentrations of flammable gas, the soils shall be wetted and the operating equipment shall be provided with spark proof exhausts.

- A dry chemical fire extinguisher, ABC rated, shall be provided on all equipment used in areas containing waste material.

- Personnel within or near an open trench or drill hole shall be fully clothed, and wear shoes with non-metallic soles, gloves, hard hat and safety goggles or glasses.

- Smoking shall not be permitted in any area within one hundred (100) feet of the excavation.

- Personnel shall be kept upwind of any open trench unless the trench is continuously monitored.

- All other applicable Safety and Health Regulations for Construction, as promulgated in 29 CFR by OSHA, shall be met. Applicable regulations include, but may not be limited to, the confined space standard (Part 1926.21(b)(6)(i) and (ii) in Subpart C); gases, vapors, fumes, dusts and mists (Part 1926.55 in Part 1926 Subpart E); fire protection and prevention (Part 1926 Subpart F); and trenching and excavation (Part 1926 Subpart P).

- Compliance with OSHA's confined space requirements for general industry, as promulgated in 29 CFR 1910.146 and Appendices A- F.

6.8 Authorized Project Field Personnel

Only authorized project personnel will be granted access to active work areas during field activities. A Log Book will be maintained by the EMSI On-Site Representative or his designee to record the personnel performing work at or visiting the Site.

6.9 Medical Monitoring

Medical monitoring will be performed in a manner prescribed by and consistent with each contractor's corporate policies.

6.10 Record Keeping and Reporting

The following records and/or logs will be maintained in the EMSI field vehicle at the Site:

- Daily Sign-in Log that documents all personnel entering and exiting the Site;
- Daily Health and Safety Meeting Log that documents personnel attending daily health and safety meetings and a brief summary of the meeting;
- Accident Report Forms that document any accidents and/or injuries at the Site, including corrective actions;
- HAZWOPER Training, Medical Monitoring, and Fit Testing Certification that document compliance with applicable requirements of 29 CFR 1910.120 for all personnel performing work at the Site; and
- Material Safety Data Sheets (MSDSs, also referred to as SDSs) that provide health and safety and emergency response information on chemicals, if any, and materials used at the Site.

All accidents (including vehicular accidents while traveling to/from the Site), injuries, illnesses, chemical exposures, fires, and/or deviations from the HASP shall be reported to the HSO. The HSO must complete an Accident Report Form for all accidents or injuries occurring at the Site. The accident or injury must be reported to the Project Manager and appropriate actions taken.

7 CONSTRUCTION-RELATED HEALTH AND SAFETY PROCEDURES

This section presents selected safety procedures to be followed during the design investigation and construction activities; this section is not intended to be all-inclusive. Applicable OSHA and Department of Transportation (DOT) requirements will be followed at all times. The measures contained herein will be supplemented as necessary with standard safe work practices. Each subcontractor will be responsible for ensuring that each of its employees complies with the appropriate OSHA construction standards and providing appropriate warnings to their Site personnel.

7.1 Hazard Communication

In accordance with 29 CFR 1910.1200, MSDSs will be retained in the EMSI field vehicle. It is the responsibility of all subcontractors to furnish EMSI with current (less than one year old) MSDSs for chemicals used by the subcontractor; before work starts.

7.2 Back Safety/Lifting

Proper lifting techniques must be followed at all times to minimize the risk of back injury. These techniques include:

1. Size up load before lifting. Test by lifting one of the corners or pushing. If object is too heavy, get a mechanical aid or help from another person.
2. When performing the lift:
   - Place your feet close to the object and center yourself over the load.
   - Bend the knees.
   - Lift straight up, smoothly and let your legs do the work, not your back.
   - Avoid overreaching or stretching to pick up or set down a load.
3. Make sure you have a clear path to carry the load.
4. Do not twist or turn your body once you have made the lift.
5. Always push, not pull, the object when possible.

Alternate techniques for carrying or moving loads are to be used whenever possible to minimize lifting and bending requirements. These alternatives include hoists, forklifts, dollies, and carts.

7.3 Electrical Safety General

All applicable regulations contained in Subpart S (Electrical) of 29 CFR 1910, Subpart K (Electrical) of 29 CFR 1926, Subpart V (Power Transmission and Distribution) of 29 CFR 1926, and any other applicable requirements must be followed during the performance of all construction-related tasks at the Site. In particular, the requirements outlined in 29 CFR 1910.331 through .335 (Electrical Safety-Related Work Practices) will be followed at all times.

While any employee is exposed to contact with the parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts shall be locked out or tagged or both in accordance with 29 CFR 1910.333(b) and 29 CFR 1926.417. It is the responsibility of all Site personnel to understand and follow these requirements.

7.4 Fall Protection

Appropriate measures will be taken to reduce the risk of falls during the performance of tasks requiring the use of ladders and/or scaffolding, including:

1. All ladders and scaffolding must meet OSHA specifications for design and safety.
2. All ladders and scaffolding must be properly secured before use per OSHA requirements.
3. Appropriate fall protection equipment must be worn at all times while working on ladders and scaffolding.

Additional requirements for the use of ladders and scaffolding, as outlined in 29 CFR 1926.450 through 543 (Subpart L, Ladders and Scaffolding), must also be followed at all times.

7.5 Operation of Mechanized Equipment and Motor Vehicles

All mechanized equipment (e.g., drilling equipment) and other motor vehicles (e.g., support trucks, excavators, backhoes, loaders, semi-trucks) shall only be operated by qualified personnel who have been trained by their employer in the proper use of the equipment. The equipment will be operated according to all applicable OSHA and Department of Transportation (DOT) regulations. Specifically, the requirements of 29 CFR 1926.600 through .606 (Subpart O. "Motor Vehicles, Mechanized Equipment, and Marine Operations") will be observed, including, but not limited to the following:

1. Seat belts must be worn at all times.
2. All heavy equipment must be equipped with a reverse signal alarm.
3. All earth moving equipment must be equipped with rollover protective structures.

7.6 Struck-By and Caught-In/Caught-Between Hazards

The potential for being struck by falling or swinging objects, or situations where an employee is caught in or caught between heavy equipment and/or other items, are to be minimized by following any and all appropriate OSHA precautions. In particular, the drilling subcontractor should incorporate provisions of 29 CFR 1926.600 (a)(3)(i), which refers to suspension of equipment or parts, 29 CFR 1926.651(e), which refers to falling loads, and 29 CFR 1926, Subpart O. which refers to machinery and heavy equipment. Precautions should include, but not be limited to, Site personnel listening for back up alarms and watching for spotters and backing equipment.

The use of towing and lifting equipment should be in accordance with OSHA and other applicable requirements.

7.7 Material Handling - General

The potential for injury due to improper material handling is to be minimized by following the material handling and storage requirements found in Subpart N of 29 CFR 1910 (Materials Handling and Storage). The following general procedures, as listed in 29 CFR 1910.176, will be followed at all times:

1. When mechanical handling equipment is used, sufficient safe clearance shall be allowed.
2. Storage of material shall not create a hazard. Materials stored in tiers must be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
3. Storage areas shall be kept relatively free from accumulation of materials that constitute hazards from tripping, fire or explosion.

Covers and/or guardrails shall be provided as necessary to protect personnel from hazards of open pits, tanks, and excavations.

8 EMERGENCY CONTACTS AND PROCEDURES

8.1 Emergency Contacts

In the event of an emergency related to the field activities, notification of the appropriate contacts from Table E-1 should be made. A hospital route map is included as Figure E-4.

When calling for assistance in an emergency situation, the following information should be provided:

1. Name of person making the call.
2. Telephone number at location of person making the call.
3. Name of person(s) exposed or injured.
4. Nature of emergency.
5. Actions already taken.

Recipient of call should hang up first – **NOT** the caller.

8.2 Emergency Procedures

The following standard emergency procedures will be used by on-Site personnel. The EMSI HSO and/or a designated substitute shall be notified of any on-Site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Pre-Emergency Planning: The provisions of this section will be discussed with on-Site field personnel during the health and safety orientation meeting. A copy of Table E-1 and Figure E-4 shall be clearly displayed in the support vehicle.

Lines of Authority: Figure E-3 presents the line of authority for Site operations with respect to safety. The subcontractor SSO representatives shall assume responsibility for the health and safety of their workers.

Personnel Injury in the Work Zone: Upon noticing any apparently serious injury in the work zone, the designated emergency signal (three horn blasts) will be sounded by the closest EMSI or subcontractor observer. All work must be halted, and all personnel must report to the location designated by the HSO at the initial safety meeting and wait until clearance is given to resume work. The HSO and/or Project Manager (see Figure E-3) should evaluate the nature of the injury. If the accident is deemed serious (i.e., bodily harm has occurred) by the Site HSO or respective SSO, an ambulance should be requested.

After any serious injury, the HSO will be responsible for evaluating Site and work zone conditions and determining the appropriate response measures, if any, that need to be implemented prior to work continuing after the injury.

Fire/Explosion: Proper storage of gasoline and other flammable liquids should be maintained to prevent or avoid spreading of a fire. Upon notification of a fire or explosion on-Site, the designated emergency signal, three horn blasts, will be sounded and all Site personnel must report to the location designated by the HSO at the initial safety meeting. The fire department will be alerted and all personnel moved to a safe distance from the involved area. Workers must know the location, use, and limitations of available on-Site fire extinguishers. The escape route from the Site will be determined by the HSO prior to start of the design investigation and construction activities and will be shared with field personnel at the initial safety meeting prior to the start of work.

PPE Failure: If any Site worker experiences a failure or alteration of PPE that affects the protection factor, that person and his/her "buddy" will immediately stop work. Commencement of work will not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment fails to operate properly, the EMSI on-Site representative and the HSO will be notified to evaluate the effect of this failure on continuing operations on-Site. If the failure affects the safety of personnel or prevents completion work tasks, all personnel will leave the work zone until the situation is evaluated and appropriate actions taken.

In all situations when an on-Site emergency results in evacuation of the work zone, personnel will not re-enter until any of the following conditions have been met, as appropriate:

- The conditions resulting in the emergency have been corrected.
- The hazards have been reassessed by the HSO and the Project Manager.
- The HASP has been reviewed and revised, if necessary.
- Site personnel have been briefed on any changes in the HASP.

8.3 Location of Site Resources

A support vehicle will be established at the Site that contains a cell phone, air horn, this HASP, the daily log book, monitoring instrument manuals, multiple sets of maps and directions to the nearest hospital, first aid kit, portable eye wash, fire extinguisher, other safety supplies (e.g., extra gloves, ear plugs, hard hats, safety glasses, and other PPE) and any other important items.

9 REFERENCES

National Institute for Occupational Safety and Health (NIOSH), 2015, NIOSH Pocket Guide to Chemical Hazards, Atlanta, Georgia, February 13. http://www.cdc.gov/niosh/npg/npgsyn-z.html.

U.S. Department of Labor, Occupational Safety and Health Administration, 1998 (revised), Training Requirements in OSHA Standards and Training Guidelines, OSHA 2254.

10 HEALTH AND SAFETY COMPLIANCE AGREEMENT

I have read, understand, and agree to comply with the health and safety procedures in this Health and Safety Plan (HASP). In addition, I have attended, understand, and agree to comply with the information presented in the health and safety pre-activity meeting. I hereby agree that (1) compliance with the HASP is a condition of entry to the Site, and (2) non-compliance with the HASP may result in work stoppage and/or dismissal from the Site.

Printed Name	Organization	Signature	Date

Personnel health and safety pre-activity meeting conducted by:

Name	Organization	Signature	Date

Tables

Table E-1 List of Emergency Telephone Contacts

Agency/Facility	Telephone No.	Contact
All Emergencies	911	Sheriff, Fire, Ambulance
St. Joseph Hospital 1375 E. 19th Ave. Denver, CO 80218	303-801-2000	See attached Hospital Route Map (Figure E-4)
Engineering Management Support, Inc. (office)	303-940-3426 x. 9	Tim Shangraw (Project Manager)
EMSI on-Site cellular telephones	303-619-5179 303-808-7227 303-807-9601	Tim Shangraw Paul Rosasco Bob Jelinek

Figures

Appendix E-1

First Aid and Emergency Care

Appendix E-2

Toxicological Properties and Hazard Assessments